

REMARKS

Reconsideration is respectfully requested for the following reasons.

Claim 1 is amended to recite that the surfactant is selected from the group consisting of organic bisulfites, inorganic bisulfites and sulfosuccinates as previously recited in claim 24. In addition, the claims are amended to remove the word "suitable." Entry and consideration are respectfully requested.

The claims are directed to a process for preparing a low color, polyvinyl butyral sheet suitable for use in the manufacture of glass laminates. Key features of the claims are:

- use of a surfactant selected from the group consisting of organic bisulfites, inorganic bisulfites and sulfosuccinates; and
- the stabilizing step (II) involving (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water.

Thus, in the claimed invention a mixture of polyvinyl alcohol, butyraldehyde, an acid or mixture of acids, water, and a surfactant (organic bisulfites, inorganic bisulfites and sulfosuccinates) obtained in step (I) is stabilized by (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water.

Claim 1 is typical of the claims and recites:

1. A process for preparing a low color, polyvinyl butyral sheet for use in the manufacture of glass laminates comprising the steps:

(I) admixing polyvinyl alcohol, butyraldehyde, an acid or mixture of acids, water, and a surfactant selected from the group consisting of organic bisulfites, inorganic bisulfites and sulfosuccinates;

(II) stabilizing the mixture obtained in step (I) by (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water;

(III) plasticizing the polyvinyl butyral resin composition with from about 30 to about 50 pph of plasticizer selected from the group consisting of triethylene glycol di(2-ethylhexanoate), tetraethylene glycol diheptanoate, dibutyl sebacate, and mixtures thereof, based on the dry weight of the resin;

(IV) mixing (a) a polyvinyl butyral bleaching compound selected from the group consisting of organic bisulfites, inorganic bisulfites and sulfosuccinates, and, optionally, (b) an antioxidant and a UV light stabilizer with the polyvinyl butyral resin composition; and

(V) extruding the polyvinyl butyral resin composition at a temperature of from about 175°C to about 225°C to obtain a polyvinyl butyral sheet having a glass transition temperature (T_g) of greater than about 32°C and a YID of less than about 12.

Applicants have also presented claims 69-76 which are directed to laminating the PVB sheets to glass. For example, claim 69 reads:

69. The process of claim 1 further comprising laminating the polyvinyl butyral sheet to glass.

In paragraph 3, Claims 1, 2, 10-12, 24-41, 46-55, 58 and 61-76 stand rejected under 35 USC 103(a) as obvious over Gutweiler (US 5,573,842) in view of Dauvergne (FR 2,401,941 Abstract), and Shohi (EP 1036775), further in view of Degeilh (US 4,696,971) and then in view of Masao (JP08-337446).

In paragraph 4, Claims 59-60 stand rejected under 35 USC 103(a) as obvious over Gutweiler (US 5,573,842) in view of Dauvergne (FR 2,401,941 Abstract), in view of Shohi (EP 1036775), in view of Degeilh (US 4,696,971), and further in view of Keppler (US 4,433,108) and then in view of Masao (JP08-337446).

Rather than present a detailed response to each point in the lengthy Action, applicants focus herein to the comments made in the Office Actions concerning why the rejections have been maintained. As explained previously, applicants traverse the rejection for the reason that Degeilh leads away from the claimed invention by teaching away from step (II) of the independent claims, which in all cases recites the “raising the pH of the mixture to at least pH 10”, and since none of the cited documents would lead the person of ordinary skill in the art to modify the process of Degeilh to arrive at the claimed invention.

To get a better understanding of the issues one can look at the present situation as involving three steps to a better process. In other words, Degeilh is focused on improving the Dauvergne, and the claimed invention is an improvement over both processes.

All three processes include the step (I) of preparing a mixture of polyvinyl alcohol, butyraldehyde, an acid or mixture of acids, water, and a surfactant, and then in step (II) stabilize the mixture produced in step (I).

Dauvergne is described in great detail in the background section of Degeilh. Dauvergne’s process is described as involving (a) using sodium alkyl sulfonate or sodium alkylaryl-sulfonate as an emulsifier, and (b) introducing a base to neutralize the mixture to a pH of between 9 and 11.

Degeilh points out a number of problems with the Dauvergne process and teaches a process that involves (i) use of sodium dioctyl sulfosuccinates (“DOS” or “DOSS”) as an emulsifier instead of the sodium alkyl sulfonate or sodium alkylaryl-sulfonate and (b) discontinuing the neutralization process as soon as a pH of 5 is reached.

In the claimed invention a mixture of polyvinyl alcohol, butyraldehyde, an acid or mixture of acids, water, and a surfactant (organic bisulfites, inorganic bisulfites and sulfosuccinates) obtained in step (I) is stabilized by (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water.

Looking at the prosecution history, one can see that the Patent Office presented a series of rejections identical to those presented in the most recent Office Action except that the Patent Office did not cite Masao. The general gist of the Actions can be seen from the Advisory Action dated January 8, 2007, which states:

“Applicants continue to argue that Degeilh teaches away from the claimed invention which requires a pH of at least 10. However, applicants fail to recognize that Dauvergne has already taught a process for preparing PVB comprising adding PVA, acid catalyst, and an emulsifier (i.e., surfactant) into a reactor with stirring, introducing butyraldehyde gradually, then, after adjusting pH to 9-11, separating the resultant PVB from the mixture (Abstract). Therefore, the rejection set forth does not require the second reference Degeilh to possess the claimed pH. Regarding whether the teachings of Degeilh can be combined with the teachings of Dauvergne because Degeilh teaches a process that [requires] a pH of no more than 5, applicants fail to recognize that the DOS teachings in Degeilh is combinable with the teachings of Dauvergne because the pH and DOS teachings of Degeilh are independent variables in the process of Degeilh. Therefore, the examiner has a reasonable basis that the pH condition of Degeilh does not prevent (or teach [away]) the DOS teachings to be incorporated in to the teachings of Dauvergne.”

Applicants argued that the rejections were improper because the features of Degeilh can not be taken separately. The Patent Office took the position that applicants' arguments were correct so long as the claims were focused on the situation where the PVB sheet would be adhered to glass. The Patent Office seems to have agreed with this point having withdrawn the earlier rejections and issuing new rejections adding Masao to the list of references. (Nevertheless, the Patent Office seems to continue to repeat many of the earlier assertions in a manner inconsistent with withdrawal of the previous rejections.)

In order to focus the discussion, the rejections can be discussed with respect to three issues:

1. Does Degeilh teach away from the claimed invention in a manner that leads to the conclusion that the invention is not obvious under 35 USC 103?

2. If the same rejections presented without the Masao reference were withdrawn, what does the Masao reference add to the rejections and does this then render the claims obvious under 35 USC 103?
3. Should applicants be restricted to claims reciting adhesion to glass in order for the obviousness rejections to be withdrawn and, if so, what is the appropriate claim?

1. Does Degeilh teach away from the claimed invention in a manner that leads to the conclusion that the invention is not obvious under 35 USC 103?

Applicants assert that the rejections are based upon an improper combination of various teachings in Degeilh and Dauvergne (FR 2,401,941).

The Action asserts that Degeilh discloses at column 1, lines 68 to column 2, line 2, that the “after-treatment is carried out in an aqueous medium under basic conditions, namely, at a pH between 9 and 11, which fully embracing the pH of at least 10 as claimed.” This statement is incorrect. In fact, Degeilh teaches away from the claimed invention because the claims are directed to a process involving the step of raising the pH of the mixture to at least pH 10, whereas Degeilh teaches a process involving a step of neutralizing to a pH of no more than 5. The portion of Degeilh referred to in the Action is discussing a prior process described in Dauvergne (FR 2,401,941) that Degeilh considers to be inadequate, and that prior process does not involve the use of a surfactant and all of the steps and process conditions claimed.

Degeilh is focused on improving the Dauvergne (FR 2,401,941) process and indicates that the Degeilh lower pH reduces costs and provides other advantages. Degeilh expressly teaches away from using DOSS in a process involving stabilizing a mixture of the type obtained in step (I) by (a) raising the pH of the mixture to at least pH 10, (b) isolating the resin by draining the liquid, and (c) washing the resin with neutral pH water. Degeilh teaches that the process should be carried out with DOSS and neutralizing to pH of no more than 5, not using dodecylbenzene sulphonate in combination with a higher pH as in Dauvergne. For example, at column 2, lines 15-20, Degeilh teaches that it is improving the process of Dauvergne (FR 2,401,941) by using the combination of discontinuing neutralization as soon as a pH of 5 is reached and by use of DOSS. At column, 2, lines 33-40, Degeilh states that “the use of DOS effective as an emulsifier substantially decreases the ‘curing time’ of the polyvinyl butyral after neutralization to a range of 5 to 10 minutes.” This can also be seen from the Degeilh paragraph beginning at column 3, line 15, which states:

“A particularly important requirement for improving the properties of the polyvinyl butyral according to the invention is the presence of DOS effective as an emulsifier. DOS advantageously facilitates the after-treatment of the polyvinyl butyral to separate the product. Unlike conventional emulsifiers which are removed from the polymer by the addition of a base, DOS is completely and inexpensively removed from

the polymer by a thorough washing with water. As a result, a product is inexpensively obtained which has superior adhesiveness to contiguous glass materials.”

From the above quote, it can be seen that the DOSS is used in Degeilh to facilitate the after-treatment of the polyvinyl butyral to separate the product in an environment wherein the pH is not raised by adding a base. Thus, Degilh is teaching away from the claimed features of step (II) of the independent process claims, which is claimed in claim 1 as follows:

“(II) stabilizing the mixture obtained in step (I) by (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water;”

Lastly, the Patent Office can not properly retreat to the position that the Dauvergne (FR 2,401,941) and Degeilh processes can be combined in some fashion to arrive at the claimed invention since Degeilh expressly teaches the need to use DOS and discontinue the neutralization process as soon as a Ph of approximately 5 is reached. (See, e.g., column 2, lines 15-23.)

2. If the same rejections presented without the Masao reference were withdrawn, what does the Masao reference add to the rejections and does this then render the claims obvious under 35 USC 103?

A second point made in these portions of the Action is that Masao adds something to the rejections. While Masao may teach random points related to manufacture of PVB it fails to overcome the defects in the rejection. Masao doesn't teach anything pertinent to the conditions for making PVB. For instance, looking at paragraph 0054 of Masao it can be seen that Masao starts with 65% PVB in zylene and doesn't teach anything about how the PVB was made. Since Masao doesn't have any teachings pertinent to the stabilizing step it doesn't overcome the defects in the initial rejection. In fact, the Action seems to recognize this point since at pages 11-12 it points to Dauvergne (FR 2,401,941) and Degeilh as teaching the features concerning making PVB that lead to the process of the invention. However, this is incorrect. Further, the Action seems to assert that Masao teaches something about making glass laminates that isn't present in the earlier rejections; however, this isn't clearly explained since Degeilh already discusses glass laminates and adhesion to glass. Hence, applicants submit that Masao doesn't add anything to the rejections.

3. Should applicants be restricted to claims reciting adhesion to glass in order for the obviousness rejections to be withdrawn and, if so, what is the appropriate claim?

At pages 7-8 and 10-12 the Action focuses on the fact that applicants added the phrase “suitable for use in the manufacture of glass laminates” in the claims. The Action states at page 7 that the phrase “suitable for use in the manufacture of glass laminates” doesn't add anything to the claims to distinguish the prior art. Then, in the paragraph bridging pages 7-8

the Action states that the prior art only teaches away from using the claimed pH when the “ability to adhere to glass is critical.”

First, applicants submit that the Action has created an issue that really doesn’t exist. This whole issue arose due to applicants attempt to respond to the Examiner’s comments at page 14 of the October 13, 2006 Office Action. Applicants added the phrase “suitable for use in the manufacture of glass laminates” to the claims in order to expedite prosecution and address the points raised by the Examiner, and in fact the Examiner did withdraw the rejections in view of this amendment only to issue new rejections. Applicants did this since applicants sell PVB sheets for use in glass laminates and therefore were willing to make this gratuitous amendment in order to obtain allowance of the claims. However, this was a gratuitous amendment made to expedite prosecution, and in fact applicants submits that the Degeilh’s claimed process advantages should not be read as being limited to improving adhesion of PVB to glass. The reason is that Degeilh discusses other advantages of the Degeilh process and these would also be considered advantages that apply to any use of PVB. For instance, at column 2, lines 24-26 discuss the fact that DOSS is completely and inexpensively removed in the Degeilh process, whereas the paragraph bridging columns 1-2 discusses the problems encountered with the Dauvergne (FR 2,401,941) process, high pH, and the use of soda or other substitutes chemicals, and states that they significantly increase the cost and prolong the process. Therefore, the person of ordinary skill in the art reading Degeilh would be led to believe that PVB used for applications other than making sheets would also benefit from the process. Hence, submit the main issues that needs to be considered is that Degeilh leads away from the process steps of the claimed invention and therefore the invention is not obvious.

Second, applicants submit that the phrase “for use in the manufacture of glass laminates” should be read into the claims since it means that the polyvinyl butyral sheet produced by the process adheres suitably to glass for making a glass laminate, such as, for example: windshields for automobiles. Thus, the claims should be read to have the scope that the Examiner wants them to have in order for them to be considered patentable.

Here, applicants also point that the main use of the polyvinyl butyral sheets of the type claimed is for making glass laminates and submit that the Examiner is raising an issue that does not exist when the Action states that the arguments presented are only appropriate for products where adhesion to glass is relevant. Concerning this point, applicants direct the Examiner’s attention to the Abstract and to the paragraph beginning on page 1, line 9. In addition, applicants direct the Examiner’s attention to the pages from the DuPont website that describe the science and history of laminated safety glass that were previously submitted (<http://www.dupont.com/safetyglass/en/science/index.html>, <http://www.dupont.com/safetyglass/en/science/history/index.html> and <http://www.dupont.com/safetyglass/en/science/technology/index.html>, and the brochure entitled “DuPont™ Laminated Glass Interlayers” which was also previously submitted.

Hence, applicants submit that the person of ordinary skill in the art would read the claims to be focused on PVB sheets that adhere to glass.

Lastly, applicants point out that claims 69-76 specifically recite the step of laminating the polyvinyl butyral sheet to glass, and the Action fails to address why these claims are not allowable. If the Examiner does not allow these claims, applicants respectfully request that the Examiner explain why they aren't being allowed.

In summary, in the claimed invention a mixture of polyvinyl alcohol, butyraldehyde, an acid or mixture of acids, water, and a surfactant (organic bisulfites, inorganic bisulfites and sulfosuccinates) obtained in step (I) is stabilized by (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water. Applicants submit that the Degeilh leads away from the claimed invention by teaching away from a process comprising the two key steps of:

- use of a surfactant selected from the group consisting of organic bisulfites, inorganic bisulfites and sulfosuccinates; and
- the stabilizing step (II) involving (a) raising the pH of the mixture to at least pH 10, (b) isolating the polyvinyl butyral resin composition by draining the liquid, and (c) washing the polyvinyl butyral resin composition with neutral pH water,

and since none of the cited documents would lead the person of ordinary skill in the art to modify the process of Degeilh to arrive at the claimed invention. For these reasons, applicants respectfully request that the rejections under 35 USC 103 be withdrawn.

In view of the foregoing, allowance of the above-referenced application is respectfully requested. Should any matters remain, the Examiner is invited to telephone the undersigned at the below-listed direct dial telephone number in order to expedite prosecution.

Respectfully submitted,

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